

APPROVED MINUTES

21st Meeting of the NECC
March 11-12,1998
Holiday Inn - Moline, IL

by

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Navigation Environmental Coordination Committee (NECC)

Minutes – 11-12 March 1998

Holiday Inn-Moline, IL

DAY 1 (11 March 1998)

1.) Welcome and Approval of Minutes of the Last Meeting

Twenty-first meeting of the NECC was called to order by Ken Barr. An attendance list is attached. The minutes of the Oct. 7, 1997 meeting were approved, with incorporation of a clarification of Sect. 1.7 by Ken Barr: Zebra mussel transport on barges will be addressed in the Nav. Study EA using existing literature. Scott Whitney provided an overview of the zebra mussel issue and addressed how this topic would be addressed in the EA. Jon Duyvejonck indicated that Pam Thiel will be addressing this same topic for the "Coordination Act Report", suggested we contact her to see that we are not duplicating her efforts.

2.) Kevin Landwehr: *Streambank erosion preliminary results*

As an introduction, Kevin provided a brief historical overview of the project outlining the objectives, methods, and products. Initial scope-of-work called for two components (1) extensive literature review conducted by Steve Maynard (WES) and Sandra Martin (WES) and (2) field survey of UMR and IWW by team of experts to document actively eroding locations. An add-on component to this study was (3) the development of a model to predict potential location of future navigation induced erosion in the IWW/UMR. A brief summary of these three components follows:

- A.) **Literature Review** – most scientific research has focused on navigation effects and bank protection, unable to find any computational method for linking commercial navigation and the occurrence or rate of bank erosion.
- B.) **Field Survey** – team of experts included scientists and engineers from Illinois State Water Survey (ISWS), the University of Iowa – Iowa Institute of Hydraulic Research (IIHR), and the U.S. Army Corps of Engineers, Rock Island, St. Paul, St. Louis, and Huntington Districts. The team evaluated 72 erosion sites (29 on IWW and 43 on UMR). They estimated that 14% of the UMR (GREAT study = 15% of navigable waterways) and 20% of the IWW shoreline are actively eroding.
- C.) **Forecast of Future Conditions** – A methodology was developed to classify bank sections as to their relative potential (high, medium, low) for commercial navigation related bank erosion. The model was applied to all portions of the main channel border (from L&D 3 to mouth of the Ohio on the UMR and from Lockport to Grafton on the IWW, approximately 2000 miles of shoreline) and the results presented on a series of GIS based maps. Important model parameters considered included:
 - (a) Average tows/day (Total/365), computed from traffic levels in 1990-92 and 1994.
 - (b) Relationship between perceived bank condition (moderate, severe, stable, etc.; based on the 1995 field survey) and important parameters such as the distance the tow is operating relative to the bankline, the available channel width (bank to bank), etc. Developed statistical measures to determine what is "close" or "narrow".
 - (c) Potential for commercial navigation induced erosion is related to the water motion that vessels create that are capable of attacking the bank line:
 - 1. Drawdown and return currents – an important parameter is the blockage ratio (area channel/area occupied by vessel) under low flow conditions
 - 2. Short period and transverse stern waves – important parameters include the distance the tow is operating relative to the bankline, the speed of the vessel, and the blockage ratio
 - 3. Direct Propeller Wash – Important parameters include the radius of the bendway, the available channel dimensions, and the distance the tow is operating relative to the bankline.

4. Fleeting activity - locate these areas
5. Temporary mooring for lockage - location of waiting points upstream and downstream of lock structures.

The relative potential for commercial navigation related bank erosion was determined by assigning a numeric score to each segment of the bank line based on how the parameters for the individual site fell in the overall distributions of the parameters for the system. Output table shows % of each pool that is considered high/med/low erosion potential and the % of the high and medium risk areas that are currently protected. Graphs show the % of shoreline at high risk of navigation induced erosion. Erosion potential is greatest in the upper pools, however spikes appear at Pool 14, Pool 20, and open river due to amount of barge fleeting in these areas.

D.) Conclusions:

- (1) Detailed sample sites visited during the field survey were exclusively eroding and therefore unsuitable for developing a model capable of predicting occurrence vs. non-occurrence of erosion.
- (2) The Majority of the high potential sites on the UMR are located in the upper portions of the UMR where channel dimensions are smallest and in areas being used for fleeting and temporary mooring for lockage.
- (3) A significant percentage (48%) of the areas identified as having a high potential for commercial navigation related bank erosion on the UMR were identified as protected during the 1995 field survey.
- (4) The method used in the analysis tries to identify sites where there is a possibility that commercial navigation induced forces contribute, in some undeterminable extent, to erosion. It can not predict the magnitude of the contribution or to what extent additional traffic would increase the possibility or extent of erosion.
- (5) The actual rate of erosion at the identified sites is dependent on the nature of the bank materials and subaqueous conditions, as well as other erosion mechanisms affecting the site.

E.) Evaluation of Significance

Identify overlap of locations with high or medium potential for commercial navigation related erosion and resources of concern. Much of this can be done in the GIS framework.

F.) End Products

Products from this study will include: (1) Literature Review, (2) Field Survey Report, (3) Bank Condition Mapping, and (4) Study Report.

*** The draft add-on study report and map set was distributed to NECC members at the conclusion of the meeting. In addition, the final field survey report will be distributed prior to the next NECC meeting, and will also be posted on the Corps website:

(http://www.mvr.usace.army.mil/pdw/nav_study.htm)

Questions/Comments

Bernie Schonhoff: (1) Was there a correlation with High/Med/Low that model kicks out and actual field sites? (2) What % of non-navigated river is eroding? Could this info serve as baseline?

Answers: (1) strong correlation (2) not sure check literature.

Don Swensson: Evaluation of protected banklines and differing slopes of revetment, is there continuation of erosion even after revetment in place?

Answer: The field survey did not sample areas that were protected. The model was applied to these areas and some were identified as having a high potential. (Wilcox) indicated that he has evidence that some of the protected areas are still eroding.

Bill Bertrand: Was scarp height evaluated as a factor in the erosion?

Answer: Yes it was considered, however, it was viewed as a symptom of the erosion at the site not a cause.

Mark Beorkman: What will be studied in the future?

Answer: No additional studies are being planned at this time.

Gretchen Benjamin: Did the study consider just commercial navigation or all navigation?

Answer: Only commercial navigation.

Ken Brummett: How will the Corps. consider any additions (sites) that the states or other agencies point out as actively eroding sites?

Answer: We would like the agencies to include the location of these sites in their review comments. It would be helpful to use a common nomenclature (RM, R&L bank) when adding or identifying sites.

3.) Chip Smith: “Environmental Initiatives and Perspectives from Washington”

The ASACW presently has six staff members in Washington, D.C.: 3 have strong environmental background, previously all engineers and one economist.

Trend in Washington Initiatives and Cooperative Projects Ecosystem wide studies partnerships between states and other agencies. Example - Clean Water Action Initiative - Gulf Coast Project (Tom Pullen) calls for the restoration of 100,000 acres of wetlands. There is an increasing number of environmental programs in the budget, 1997-17%, 1998-25%, and 1999-30%.

President Clinton’s Challenge 21 appropriates \$586 million for EPA, Corp, etc. To implement water initiative projects. This legislation differs from previous legislation in that “discretion to implement environmental issues without looking at economically based cost-benefit-ratios” Instead these projects would factor in the value to public or future usage, environmental and cultural values. For example, relocation after flood event given 100% relocation funding instead of 10% as has been in the past. These areas may in turn be reverted to natural areas.

Questions/Comments

Mark Beorkrem: For the last five years biologist have discussed the shortcoming of the Corps. biological work (Nav. Study). A common complaint is that we are confined by a deadline that is not consistent with the detail that is necessary from biologist.

Bill Bertrand: Will states and other agencies be involved in the environmental initiatives?

Answers: Gen. Anderson is setting up Task Groups, which will represent a diverse number of interests and areas of expertise.

Mark Beorkrem: When will we see report on EMP ?

Answer: Anticipated by the end of March 1998, expected to support reauthorization of EMP.

4.) Clint Beckert: Cumulative Impacts

Primary objectives of the cumulative impacts study is to assess the present and future impacts of 9-foot navigation project.

Approach

- a.) Use multi-disciplinary team of experts.
- b.) Analyze existing data.
- c.) Predict future conditions based upon observed trends.
- d.) Primary focus on impacts from sedimentation, structures, and dredging.
- e.) Predict ecological response:

Components

Geomorphic: Primarily deals with historical changes in channel planform related to geologic processes, human influences, sedimentation, and historic changes in channel morphology. Evaluation of historic changes in channel planform based on historic sequence of maps and photos: pre L&D, post L&D, 1975, and present. Similarly, changes in channel cross sections will utilize historic information from: Brown’s survey (maps and photos) and ~1000 hydro channel soundings and cross sections. Historic cross sections, dredging data, and mainstem/tributary loading data will be used to estimate sediment deposition by pool and to develop sediment budget estimations. UMRS Sediment Budget developed for Pools 4-26 for the following time periods: (1) Post dam to early 1950’s and (2) 1950’s to present.

Channel Maintenance Activities: Review of dredging, placement, and structures is being conducted. Trends in dredging quantities and dredging locations is being investigated. Tom Keevin is summarizing ecological impacts of structures. A literature review found no data on system losses from wing dams, biological effects of flow patterns. Some info on what happens after a wing dam is installed. Numerous reports on biological effects following structure construction (i.e. benthic critters show up and fish utilize these areas, beneficial).

Hydrology and Hydraulic Studies: using existing RMA-2 models for UMR Pools 5,7,8,11,13,21,26 and IWW LaGrange Pool. Results will feed into ecological predictions. Flow frequency/flow duration analyses. Modeling analyses are being conducted by EMTC (Wlozinski, Nelson, Theiling, Yin, etc.).

Ecological Response: (1) Identify guilds of organisms based on their utilization of various habitat types, (2) Describe each guild of organisms including habitat requirements classification system, (3) Predict physical templates, develop rules-based models for predicting future ecological responses of organism guilds to planform alterations, and (4) Develop GIS mapping for depicting future conditions.

*** **Draft Report** due by May 15, 1998

Questions/Comments

Jon Duyvejonck: Are you using historical maps to quantify losses or gains to various habitat types (i.e. islands, side channels)? Can we use this information to answer questions such as "What % loss of backwater habitat"?

Answer: Best case scenario is to have this info for entire UMRS but may have to fall back to the trend pools to answer these types of questions.

(5) Sandra Martin: Physical Effects Modeling and Extrapolation (Initial results)

(A.) Physical Effects Modeling is a system approach that incorporates the following traffic information:

- 1.) Configuration characteristics (Fleet characteristic): Types of fleets you can expect on the UMRS. Type File (108 combinations) (a) Direction: Up/ Down, (b) Size S/M/L, (c) Speed S/M/F, (d) Draft L/M/E, and (e) Prop type
- 2.) Interarrival Times based on exponential equation and Monte Carlo Sampling Algorithm
- 3.) Sailing Line distributions, based on probability of boat being in L/C/R side of main channel.
- 4.) Forecast – number of tows per day, by pool by month, per year, per alternative.

Questions/Comments

Mark Beorkrem: Inter-arrival times are not based on actual field surveys?

Answer: Exponential equation to determine the interval between barge traffic ultimately getting the total number of vessels/day.

Mark Beorkrem: Sailing line observations based on informal survey?

Answer: Yes, in conjunction with interviewing industry or Corps operations staff.

(B.) NAVEFF Model Summary (HANDOUTS SM1-2)

- 1.) Model read traffic trial (108 combinations) compute the physical effects on the R/C/L sailing line using the following computations to generate an estimate of Vmax from vessel drawdown only:
 - (a) return current
 - (b) drawdown
 - (c) velocities beneath the vessel
 - (d) shear away from the vessel
 - (e) shear beneath the vessel
 - (f) scour depth
 - (g) wave height
- 2.) NAVEFF goes from bankline to bankline main channel only.
- 3.) Sediment re-suspension (main channel/nearshore) computed based on the maximum change in suspended sediments. **(HANDOUTS SM3-4)** Definitions:
 - (a) Cohesive sediments - mixture of sand, silt, and clay, subject to long-term re-suspension.
 - (b) Non-cohesive sediments - primarily sand, will pick up and fall back down very quickly.
- 4.) Out puts from NAVEFF will be used to generate look-up tables for various sediment types and corresponding wave heights. For example: Question: What % of near-shore zone of UMR and IWW consist of non-transferable (non-cohesives) sediments and is not at risk of re-suspension from moderate barge waves? Answer: UMR=86% and IWW = 46%.

(C.) UMRS Hydraulic Classification

- 1.) Based on previous aquatic areas classification
- 2.) Useful for interpretation of site specific modeling to entire system
- 3.) Used for hydrodynamic, sediment transport, and biological modeling efforts
- 4.) Exportable to CD for resource agencies
- 5.) Types: Main channel, side/secondary channels, backwaters, and other (tributaries, wing dams, levees, bridges, etc).

(D.) Side Channel/Backwater System Model (HANDOUT SM5)

- 1.) UMRS separated into two sections (Pools 4 - 17 and Pools 18 – 27) based on backwater planform, river slope, and suspended sediment concentrations.
- 2.) Analysis based on backwater types and various attributes
 - (a) Contiguous Backwater (122 delineated) – inlet(s) and outlet(s) to main channel and through channels. **(HANDOUTS SM6-7)**
 - (b) Single Channel Contiguous Backwater (33 delineated) – one channel connection to main channel. **(HANDOUT SM8)**
 - (c) Impounded Contiguous Backwater (21 delineated) – areas generally immediately upstream of certain dams created with pools. **(HANDOUT SM9)**
- 3.) Ensure that modeled and trend pool data are applicable to document system responses
- 4.) Integration for system response **(HANDOUT SM10)**

Questions/Comments

None, audience speechless.

6.) STATUS OF REPORTS

(A) Tom Keevin *Fisheries Studies*

- 1.) Larval Fish – John Dettmers finished analysis of larval fish and will provide this information to Steve Bartell for modeling. Report should be finished by end of month.
- 2.) Shear – Completed, will be sent out for review soon.
- 3.) Drawdown - Completed, will be sent out for review soon.
- 4.) Adult Fish – Report finished by March 13.
- 5.) Spawning Study (SENES) should be finished in 6 -8 weeks
- 6.) Mussel Modeling HSI and Bioenergetics - Completed, will be sent out for review soon.
- 7.) Winter Study (Sheehan) now being tested by Maynard in Flume Study
- 8.) Doppler Field verification of velocities behind wing dams –spring/summer 1998
- 9.) Fish Hydroacoustics behind wing dams and during tow passage - spring/summer 1998

(B) Dan Wilcox, *Plants and Recreational Traffic*

- 1.) Recreational Boating Report - comments have been received now being addressed.
- 2.) Literature review (Sorenson) wake waves from recreational boats will be published by WES Env. Report #4 will distribute next week.
- 3.) Effects on Vegetation - Turbidity effects on aquatic plants will be distributed at this meeting.

(C) Sandra Martin, *Modeling*

- 1.) HIVEL - Users Manual – Draft 90% complete
- 2.) Sediment Transport Modeling – Not started
- 3.) Physical forces by tows – Draft 90% complete
- 4.) Wave Height - techniques calculations – Draft 10%
- 5.) Development of NAVEFF for fish spawning – not started
- 6.) Literature Review for Bank Erosion – Final HL-96-10
- 7.) Hydraulic areas classification – not started

Day 2 (12 March 1998)

7.) Steve Bartell - *Impacts of Commercial Traffic on Fish*

The fishery models rely on a number other Navigation Study Model outputs to provide important input variables. Some of the input variables need by the fishery models include:

- (a) Traffic forecast provided by the Economics model
- (b) Traffic characteristics incorporate variables such as:
 - 1.) Pool 4.) Configuration 8.) Open wheel/kort nozzle
 - 2.) Month 5.) Speed 9.) Propeller diameter
 - 3.) Direction 6.) Draft 10.) Sailing line
 - 7.) Horsepower
- (c) Physical forces
 - NAVEFF –velocity changes, return currents, shear stresses.
 - DIFFLARV – Entrainment volume (Cu. ft/sec moving through the propellers)
 - HIVEL, TABS, RMA10, NAVEFF – Sediment resuspension

Ecological Risks for Fish:

- (a) Entrainment mortality (equiv. adult loss)
- (b) Recruitment forgone
- (c) Production forgone
- (d) Spawning habitat denied
- (e) Low temperature effects

Steve indicated that he would only discuss the first three listed ecological risks (a-c) at today's meeting.

(A) Entrainment Mortality

- (a) Conditional Entrainment: fraction of initial population killed by entrainment assuming no other causes of mortality (Boreman et al. 1981). Assumptions: accuracy of data used to develop parameters, instantaneous redistribution, and uniformity of natural mortality.
- (b) Model for integrated assessment ($T_i = n_i R_i w_i f_i t_i$). Values for this model were obtained from the scientific literature and/or expert opinion (Gutreuter, et al.) (**HANDOUT SB1**)
- (c) Equivalent Adults Lost (EAL) model assumptions and caveats: population is in equilibrium sensitive to parameters derived from field data, assumes constant survival probability. (**HANDOUT SB2**)

Sources of larval fish density data: 1996-97 (Dettmers), studies conducted by Leslie Holland Bartels, studies and monitoring reports from Power plants.

HANDOUTS - Copies of the following handouts are provided with the minutes:

- SB3** - Fish species for which we have larval density data (24 species).
- SB4** - Fish species for which we do not have larval density data (6 species).
- SB5** - Possible w_i values.
- SB6** - Sum of preliminary w_i values for **commercial** fish species.
- SB7** - Sum of preliminary w_i values for **sport** fish species.
- SB8** - Sum of preliminary w_i values for **forage** fish species.
- SB9** - Sum of preliminary w_i values for **listed** fish species.

Questions/Comments

Bill Bertrand: What about fish that are pelagic spawners and are concentrated in main channel?

Answer: The w_i values that have been developed thus far do not exceed 1. The highest value of 1 assumes that distribution is equal across the channel. At this time, a w_i value does not exist for distributions that are more concentrated in the main channel (subject to further discussion). Because of their life history strategy, main channel spawners would be at higher risk of entrainment mortality.

Tom Pullen: List of species with no data, Why ?

Answer: They were either, not caught or there was no published literature.

Bernie Schonhoff: How did you arrive at w_i values definition of small, very small, or fairly small proportions?

Answer: Expert opinions from small group or available resources. Will provide values used for each of the different fish species to NECC members (included with minutes).

Steve Johnson - If we would have included the initial fish sampling protocols (POS) would we have the information we needed?

Answer: The POS also assumed use of existing information in conjunction with laboratory experiments and three years of sampling at three location. Navigation Study did 2 years at three locations.

- (B) **Recruitment forgone** - recruits lost due to entrainment mortality of larvae, number of individuals; estimates changes in size of entrained cohort (e.g., growth-mortality), based on recruit parameters, useful for recreational species, assumes equal distribution (Jensen, 1990). **HANDOUT SB10** - The formula and model parameters for the Recruitment Forgone Model are provided with the minutes
- (C) **Production forgone** - estimates how much biomass would have been produced by entrained larvae (e.g. useful to assess impacts on forage fishes). Model is sensitive to estimates of asymptotic adult weight (W_{inf}) and larval age-0 (and juvenile) fish mortality. (Jensen et al 1990). **HANDOUT SB11** - The formula and model parameters for the Production Forgone Model are provided with the minutes.
- (D) **Example model runs** - Steve showed examples of gizzard shad dataset and explained different outputs from month to month. Ran a model simulation to provide an estimate of species entrainment. Summarized model outputs for each of the ten-year incremental periods and by reach. **HANDOUTS** - Summary tables provided with minutes include: **SB12** - Gizzard Shad Pool 8, 2000; **SB13** - Pool 8, 2020, effects on Channel Catfish, Sauger, Walleye, and Goldeye; and **SB14** - Incremental Effects: Gizzard Shad Pool 8, 2000.
- (E) **Sources of Uncertainty**
 - (a) Traffic - coefficients for calculating Q_p (entrainment volume), vessel speed, vessels/day, fleet characteristics
 - (b) Fish data and models - larval densities, w_i values, f_i values, natural mortality, growth rates
(Hope to get the best values possible for these topics)

Questions/Comments

Mark Beorkrem: Are you using Mississippi River data for fish mortality? Some lake fish data?

Answer: Some data is from lake or non-river systems but that is the only available info.

Mark Beorkrem: How do you deal with equilibrium?

Answer: Model parameters, look at factors which are most responsible for increasing the uncertainties, don't know about population fluctuations for all species. LTRMP data

Bernie Schonhoff: How much time do we have to "tweak" the data and correct the changes?

Answer: April 1, run the model with the traffic info to arrive at the NED plan, April - Sept. NECC members may be able to evaluate and comment on the model. Summarize how we obtained the model input parameters or values that the model uses.

Comment: (Steve Bartell) - Much of the information derived as model inputs was obtained from workshops, experimental work, field data, and input from NECC members.

Comment: (Tom Keevin) - most commonly asked questions/remarks: "I don't understand how this information fits into the model?" "How much water was being pumped through the prop?" A: We did a study to obtain the needed value. "What was the mixing potential after the boat passes?" A: We contracted with Ed Holley which determined that mixing was fairly rapid. Density data, variability in fish densities are so high that increasing sampling still would not provide a definitive answer, have to rely on average numbers. Data that relies on other sources of info (lakes) is done so we get values.

Bernie Schonhoff: How do we respond to our administrators when asked "how good are these models?" We really need time to evaluate or understand the model not just in a short presentation.

Jon Duyvejonck: I don't see these values as written in stone, models will continue to develop or refine over time as new info comes available. Flexibility is essential in dealing with mitigation issues. FWS expects the refinement process will continue. **Adaptive Mitigation Strategy.**

Bernie Schonhoff: we will have to live with these values for some time at least to evaluate mitigation methods.

Answer: Provide a range of values and focus on avoid/minimize before we consider compensation. Each will have to come to an understanding of input parameters, uncertainties, and output

Comment: (*Tom Keevin*) These fisheries impact models have been in the published literature since 1940's and have been widely used by fisheries biologist.

Question: How can be best share this information in a timely manner?

Responses:

Tom Keevin - Provide input values? (Seventeen species are done)

Bernie Schonhoff - Sensitivity and Risk analysis is extremely important.

Steve Bartell - tried to use the most restrictive datasets to hopefully show the worst case scenario (i.e. density) The BIG BAD BOAT Scenario. This whole modeling plan is based on a Risk analysis approach

Question: (*Ken Barr*) - Can we put outputs on the web for species?

Response: (*Group*) Yes, that would be helpful

Bill Bertrand: Assumption of stable populations, may be violated at the outset since we do not know whether they are increasing/decreasing. May want to focus on those species with extensive datasets.

Bernie Schonhoff: Can you summarize this model in one page assumptions, violations, and outputs? Most administrator only have time for a short summary.

Answer: (*Kym Campbell*) During last meeting we (SENES) distributed a two page summary of each model. Can be made available to those who have misplaced their copies.

Bill Bertrand: Commonwealth Edison Nuclear Power Plant near Quad cities implemented a 25 year study to evaluate impacts, would like to see the same thing with this study.

8.) Kym Campbell - *Potential Impacts on Submerged Aquatic Plant Growth*

Potential Impacts:

- (a) Changes (increase) in suspended sediment concentration resulting from traffic projections (tows/day).
- (b) Increase in light extinction coefficient resulting from increased suspended solids (14% of UMRS is soft cohesive sediments)
- (c) Decreased submerged aquatic plant growth and reproduction resulting from increase in light extinction.

Bottom Line:

- (a) w/o project conditions causes a slight increase in submerged aquatic plant growth and reproduction attributable to the decrease in barge traffic.
- (b) The increase in traffic projections resulted in a 0-2.7% decrease in submerged aquatic plant growth and tuber production, using preliminary Pool 9 data.

Plant model is essentially a modification of a bioenergetics model developed by Elli Best (CEWES). It has been adapted for various other plant species. Literature review provided some of the necessary parameters: (1) as a result of a passing tow, ambient suspended sediment concentrations increased up to 21.7% in channel border areas of Pool 9 (Smart et al., 1985); and (2) the duration of increased suspended sediment concentrations resulting from a passing tow is 1 hour (Pratt and Fagerburg, 1997).

Handouts: The following handouts are provided with the minutes:

KC1 - Initial conditions – Pool 4 (From monthly summary statistics for LTRMP main channel sites from 1991-1996).

KC2 - The relationship between suspended sediment concentration, secchi depth, and light extinction developed for the submerged aquatic plant models.

KC3 - Regression equations developed to calculate the relationship between secchi depth and suspended sediment concentration in Pool 4 (using LTRMP main channel site data from 1991-1996).

KC4 - Light Extinction coefficient (Giesen et al 1990)

KC5 - Model flowchart

KC6 - Model output for Pool 4

KC7 - Figure depicting Photons of light forgone resulting from a passing tow. "What is most important is the total amount of light lost regardless of whether it is pulsed turbidity or consistent turbidity".

KC8 - Daily traffic projections for Pool 4 during the submerged aquatic plant growing season .

KC9 - Percent decrease in daily light available to submerged aquatic plants in Pool 4

KC10 - Percent change in *Potamogeton pectinatus* growth and reproduction in Pool 4

KC11 - Percent change in *Vallisneria americana* growth and reproduction in Pool 4

Sources of Uncertainty arise from (a) traffic projections, (b) ambient suspended sediment concentrations, and (c) getting from change in suspended sediment concentrations to increase in light extinction.

Questions/Comments

Bill Bertrand - Sediment re-suspension attributable to waves in the backwaters? Would like to see data that shows that the re-suspension in backwaters is minimal.

Answer: model does not address this phenomenon, primarily focuses on main channel near-shore zone re-suspension of sediments since this is the area where the shear forces are sufficient to re-suspend sediments, not in backwater areas.

Gretchen Benjamin: 2.7% loss of *Vallisneria* is this cumulative over 50 years or annual loss? If the latter, cumulative effects of loss would be quite significant.

Answer: The 2.7% reflects the decline in tuber growth not a loss of 2.7% of the *Vallisneria* plants.

Bernie Schonhoff: Do we have modeling information for submersed aquatics in the rest of the Pools? Traffic will likely be much higher in lower pools and subsequently the impacts will be greater?

Answer: Traffic information is available for all pools. With the exception of Pool 19, we are not aware of any substantial submersed aquatic plant beds that may be affected below Pool 13 (so with the exception of Pool 19, Pools below Pool 13 will not be part of the modeling effort). Ambient suspended sediment conc./light extinction are available for Pool 26 and the (modeled) increase in suspended sediments due to a passing tow will be available for Pool 26 also.

Mark Beorkrem: Are we evaluating water level management strategies to compensate for losses in Aquatic plants?

Answer: (Ken Barr) No

Jon Duyvejonck: What year is the without project increase based on? Concerned about cumulative effects, i.e. loss of 3% tuber growth, L&D 26 impacts added to increment from increased project.

Answer: (Ken Barr) 2000 is the baseline for without project.

Bill Bertrand: Would more traffic improvements allow for more evenly space barge traffic? and would this cause a ratcheting up of the effects?

Answer: This would be better for the model since they would be picked up as separate events.

9.) David Abraham (WES Engineer) *Backwater Sedimentation*

Development of Rules for classification of backwater habitats

Describe the physical world with numerical 2-D computations (model)

SEDD2V Velocity and water surface elevations are typical inputs for the old models had to incorporate barge factors to account for barge passage

Showed outputs from model pertaining to sheer forces

Showed entrainment of 0.5mm sand at three flow rates high/med/low resulting from the passage of a tow.

Bill Bertrand: - Same analysis for fine materials ?

Answer: Yes, showed test loop of fines (0.0625) entrainment in La Grange Reach.

This is cutting edge technology and we are pushing the envelope of technology much of this is not definitive at this point

Bill Bertrand: - Does the model account for barges meeting or at closer intervals?

Answer: No and Yes. Presently can only account for ratcheting effect. Incidence of barge passage usually occurs at waiting areas or at the Locks and Dams.

10.) Significance Roundtable

(A) Plants (Keevin)

(Tom Keevin) – Commercial navigation effects on aquatic plants evaluated based on (1) breakage or loss of plant material due to wave action and (2) growth rates (model) under conditions of increased turbidity and sediment deposition.

Significance = Effect on community as a whole, area affected, habitat denied, degree to which plant propagules will sustain themselves in certain areas.

Significant Loss = reduction of area of plant coverage, comparison of present vs. future with project projections

Avoid/Minimize measures will be considered.

Steve Bartell: - Significant magnitude of impact lies within range of natural variability? Management strategies must be more selective in determining how to address significance.

Gretchen Benjamin: - Natural variability, what is it really? It is no longer a natural system we don't know what baseline to compare too?

Answer: (Ken Barr) - Tools (direct effects) from Navigation study are geared for with and without project effects and not designed to evaluate natural variability.

Answer: (Steve Bartell) - 1989 plant coverage data was used to evaluate impact since it was such a tremendous plant year. Significance level will have to reflect spatial component (i.e. 3% loss of vegetation is significant in Pool 19 but may not be in Pool 4). Not a direct correlation between loss biomass and cumulative impact ($3\% / \text{year} = \# \text{ years until extinction}$)

Jon Duyvejonck: Diving ducks may be impacted since they would need more energy to dive repeatedly for smaller sized tubers.

Ken Brummett: Eating more tubers by ducks would lead to quicker extinction of tubers.

Steve Bartell: if we see a change in tuber size that should be analyzed as significant and viewed as a threat to the future success of the critter.

Bill Bertrand: Losses will not be evenly distributed among Pools, loss in Pool 19 will be more significant than other areas.

Answer: The rarity of the resource should be addressed and factored into the determination of significance.

Gretchen Benjamin: Upper Pools are showing signs of stress and don't want to exceed that threshold as has been done in the lower river. Therefore they want to prevent any additional losses.

Ken Barr: getting back to the compensation/mitigation issue.

Jon Duyvejonck: Mitigation studies and discussion from the Pool 26 study (handout) use as starting point for the discussion.

Tom Pullen: Uncertainty concerning significance there are a lot of points for avoid/minimize and differing opinions on significance. Try to use adaptive mitigation strategy.

Jon Duyvejonck: If we can't determine an impact level the next step is to evaluate if it is significant or not, more studies and more money.

Ken Barr: The Navigation study will identify the magnitude of effect in various areas and address the issue of significance and impact and avoid/minimize proposals. Will identify where additional studies may be needed.

Ken Brummett: What will be the drawdown effect on submergent vegetation when they are presently non-existent? What will come in after a drawdown? Will we be seeing more millet or smartweed, and is this a desirable effect?

Dan Wilcox: this is a separate issue.

Ken Brummett: Is Pool level management going to become an avoid/minimize issue?

Answer: (Ken Barr) - Water level management scenarios will not be specifically addressed for avoid/minimize or compensation.

Answer: (Tom Keevin) - St. Louis used avoid/minimize monies to address the drawdown issue therefore they may be leaning towards this as an avoid/minimize issue. (Ken Barr) - Rock Island District is using operations funding for Pool 13 drawdown study.

Dan Wilcox: Drawdown is seen as a means to boost emergent aquatic vegetation.

Ken Brummett: Would emergent vegetation create a dampening effect on sediment re-suspension?

Bill Bertrand: Barrier islands may be a possible mitigation technique.

Ken Brummett: Chevrons as dredge disposal sites and creation of wetland habitat.

Mark Beorkrem: Pools with identified plant problems right now, how would we assess significance?

Answer: (Ken Barr) nothing from nothing = nothing. If plants can not grow there now then the impact would be zero.

Mark Beorkrem: What if it prevents the future re-colonization even further?

Answer: (Ken Barr) we do not have a mechanism in this study to quantify the past impacts and how to address these past ills, we will not be looking for ways to deal with these issues.

Dan Wilcox: What % increase in suspended sediments (SS) will be attributable to increased traffic? May be feasible to determine ways (integrated management) we can reduce SS on the system.

ACTION: Avoid/minimize measures from Pool 26 issues – *Jon Duyvejonck* will review and list possible ways to compensate for plants. *Dan Wilcox* will provide information. State representatives should suggest to *Jon Duyvejonck* any ideas they may have of alternative measures.

Jon Duyvejonck: How hard would it be to take out all traffic on the system and use that as baseline to evaluate the effects of various levels of traffic.

Rick Nelson: Could we go back to prior to the construction of the second lock at L&D 26 as baseline?

Answer: (Ken Barr) The UMRS has been commercially navigated since the 1930's and the 2nd lock at 26 is part of the existing conditions for this navigation study.

Steve Bartell: Pool by pool basis for evaluating if vegetation is increasing/decreasing or stable since this will be important in addressing (context) significance.

Don Swensson: Remembering flood events of 1960's floods and 1993 areas that are closer to that threshold of loss may not be able to respond or survive a natural disaster.

(B) FISH

Production forgone, lost recruits, lost adults but for significance believe we should look at only sport fish. Idea that forage fish are not limited and therefore do not need to be compensated for.

1.) Forage Species (Gizz. Shad, Shiners, Minnows)

QUESTION: Would you (agencies) consider the loss of forage fish (i.e. Gizzard Shad and Shiners) as a significant loss, justifying compensation?

RESPONSE:

Bill Bertrand: Do not perceive the die-off of forage fish as a significant effect. We would not likely make it a point of contention

Bernie Schonhoff: Abstain

Gretchen Benjamin: No, but will present the question to fisheries biologists back home.

Ken Brummett: Hesitant to dismiss them since we (MO) place value on all components. Do not place a lot of sampling effort on larval fish. Bound to have an effect somewhere. Do not agree with Sheehan's paper (naive approach)

Steve Johnson: Doesn't feel comfortable making a policy statement.

Jon Duyvejonck: Can you tell me they are not significant?

2.) Commercial Species: (Suckers, Carp, Catfish, Buffalo, and Drum)

First need to identify how much of a loss would be within acceptable limits. Compensation/mitigation discussed value (dollars/pound) for commercial market, percent of historical catch from each Pool

3.) Sportfish: (Walleye, Bass, and Bluegill)

Compensation/mitigation should be based on recruitment forgone, adult loss, dollars spent by anglers, value to angler, costs to improve habitat.

Jon Duyvejonck: Don't write off the fisheries significance issue based on NED plan, not applicable to important regional significance

CONSENSUS We will **not** accept any net loss of sport fish, will need to compensate for!

Compensation Options: (*Tom Keevin*)

- (a) Individuals – Stock larvae/juvenile/adult fish
- (b) Fish Habitat Improvements -Spawning habitat study, Winter habitat,
- (c) Monetary - AFS \$ values for individual fish, use money to increase/improve fish habitat, nursery habitat (moist soil units).

Avoid/Minimize Options

- (a) Move navigation buoys to direct traffic away from important ecological areas.
- (b) Construct L-dikes to create better habitat
- (c) Create off- bank revetments which have been shown to be conducive to fish populations, possible mitigation strategy

Bernie Schonhoff: Limiting barge season to x months was in the winter study POS. Is it still possible to consider this as an avoid/minimize technique?

Tom Keevin: Don't see how this would be possible since we are proposing and increase in traffic but at the same time limiting the number of months they can be on the system.

Ken Brummett: Sheehan's paper indicates different fish species respond differently to temperature and velocity.

Tom Keevin: Sheehan looked at a range of species in various habitats and categorized fish species by their tolerance levels (i.e. high, medium, and low).

Bill Bertrand: Engineering improved habitat by creating areas with differing flow instead of altering flow for navigation purposes. I believe it is possible to direct efforts to beneficial uses (i.e. improving side channel and backwater habitat by shunting flow through these areas).

Ken Brummett: Deep water off channel overwintering areas are limited in lower pools therefore this would be an important improvement project.

Bernie Schonhoff: Want to analyze the possibility of shutting down traffic for 45+ days from December through February.

Mark Beorkrem: Should try to maximize both economical and environmental issues. Burden should **not** be on environmental side to accommodate or accept all the mitigation.

Bill Bertrand: Evaluate alternative traffic regulations (i.e. slower travel times) will reduce entrainment and prevent buildup at lower end of the pool would be beneficial to fisheries and reduce sediment re-suspension.

Jon Duyvejonck: USFWS would be in favor of habitat based compensation since it would be beneficial to several species rather than a single species.

Tom Pullen: I believe we are breaking new ground in addressing the mitigation issue, Adaptive Mitigation Approach.

11.) Ken Barr – Governors' Liaison Committee (GLC), Plan Formulation Schedule

Preliminary runs of Economic model indicates an incremental increase in commercial traffic through 2040.
 Without Project Plan, barge traffic will decrease.
 New run of the Economic model will occur by April 1, 1998 to provide info for GLC presentation
 Handout (GLC Plan Formulation Schedule).

We still need to evaluate cost estimates for mitigation methods.
 Ecological losses for x fish would be \$xxx this will then be incorporated into the Economic cost model
 Fish spawning and sediment re-suspension study will not be ready and therefore will not be presented to
 Colonel Anderson in the April briefing.
 EIS Release date June 1999

12.) Meeting Synopsis

Illinois (Bill Bertrand)- innovative and valuable models, expressed concern about reliability of data being fed into these models

Wisconsin (Gretchen Benjamin) - Models, get some river folks to see these models (i.e. UMRCC) or tech section meetings next fall

Iowa (Bernie Schonhoff)- glitzy models, hopefully they will give us the answer, state-of-the-art, but so was blood letting, don't want to rely on them too heavily, will take a while to evaluate all the input and output parameters, but the true value will be determined in how they relate to the actual environment or natural systems.

Missouri (Ken Brummett)- Models are only as good as what goes into them still need a dose of reality and real issues.

Minnesota (Steve Johnson) – no comments.

USFWS (Jon Duyvejonck) - L&D 26 revisited, all this talk about innovative mitigation strategies, unless we can organize these options and organize a common front so they aren't pushed to the wayside and end up

in court. Missing the recommended mitigation options on previous handout will send out this 1-2 page handout with the minutes.

USEPA (*Al Fenedick*) - no comments

SENES (*Steve Bartell*)- appreciate input and constructive criticisms on models.

MRBA (*Mark Beorkrem*) - Who is writing the recommendations for the NED plan? Subjective conclusions?

Answer (*Ken Barr*) Corps of Engineers, primary team technical study managers, planning & formulation study committee.

USACOE (*Dave Tipple*) - appreciate the input

Scott Estergard – Reminder, site specific report scheduled to receive comments back from NECC committee by April 4.

13.) Next NECC Meeting Scheduled for June 17-18 at the Plaza One Hotel, Rock Island, Full day 8-4 then 8-12, respectively.

HANDOUTS

Physical Effects and Extrapolation Presentation to
NECC

March 11, 1998

by

Sandra Martin
CEWES

HANDOUTS

Impacts of Commercial Traffic on Fish
Methods and Preliminary Results

21st Meeting of the NECC
March 12, 1998

by

Steve Bartell
SENES Oak Ridge, Inc.

HANDOUTS

Potential Impacts of Commercial Traffic on Submerged Aquatic Plant Growth

**21st Meeting of the NECC
March 12, 1998**

by

**Kym Campbell
SENES Oak Ridge, Inc.**

Attendance List
NECC Meeting 11-12 March 1998
Holiday Inn, Moline, IL

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